Objective: Although there is evidence for a beneficial effect of increased quadriceps strength on knee symptoms, the effect on knee structure is unclear. This study examined the relationship between change in vastus medialis (VM) cross-sectional area (CSA) and knee pain, tibial cartilage volume and risk of knee replacement in subjects with symptomatic knee osteoarthritis (OA).
Methods: 117 subjects with symptomatic knee OA had a knee MRI at baseline, 2 years, and 4.5 years. VM CSA was measured at baseline and 2 years. Tibial cartilage volume was measured at baseline, 2 years, and 4.5 years. Knee pain was assessed by the Western Ontario and McMaster University Osteoarthritis Index at baseline and 2 years. Knee joint replacement over 4 years was determined.
Results: Baseline VM CSA was inversely associated with current knee pain (r=-0.16, P=0.04) and medial tibial cartilage volume loss from baseline to 2 years (B=-11.2, 95% CI -20.1 to -2.4), but not baseline tibial cartilage volume. In addition, an increase in VM CSA from baseline to 2 years was associated with reduced knee pain over the same time period (r=0.25, P=0.01), reduced medial tibial cartilage loss from 2 to 4.5 years (B=-16.8, 95%CI -28.9 to -4.6), and reduced risk of knee replacement over 4 years (OR=0.61, 95%CI 0.40-0.94).
Conclusions: In a symptomatic knee OA population, increased VM size was associated with reduced knee pain and beneficial structural changes at the knee, suggesting management of knee pain and optimizing VM size are important in reducing OA progression and subsequent knee replacement.

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SEVERITY OF COMORBID OSTEOARTHRITIS IS NOT ASSOCIATED WITH INCREASED RISK FOR INCIDENT DIABETES MELLITUS

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Purpose: We have previously shown a strong cross-sectional relationship between severity of osteoarthritis (OA), measured using WOMAC scores, and the odds of self-reported prevalent diabetes mellitus (DM), which became non-significant after controlling for a common risk factor, obesity. Unknown however, is whether or not the presence or severity of OA increases risk for development of DM. Painful OA may increase risk for DM by limiting mobility and fitness, which can lead to greater weight gain and stress. Our objective was to determine the relationship between hip/knee OA severity and risk for incident DM.
Methods: This retrospective cohort study utilized data from a longitudinal population cohort with moderate-severe hip/knee OA recruited in 1996-98 through survey of 100% aged 55+ years in two regions of Ontario, Canada. Baseline interviews assessed socio-demographics, OA severity (WOMAC), body mass index (BMI), mental and general health status (SF-36), and self-reported comorbidity, and were linked with Ontario health administrative databases to assess adverse health outcomes and health care use. OA participants with DM at baseline were excluded, based on meeting criteria for inclusion in the validated Ontario Diabetes Database (ODD) *OR* self-reported physician diagnosis of DM 'ever'. Individuals with $\geq$ 1 hospitalization or 2 physicians' claims for a diagnosis of DM (ICD-9 diagnostic code 250.x) within a 2-year period are included in the ODD. Our primary outcome was the development of DM post-baseline until 2011 based on the above criteria. Cox proportional hazards regression was used to examine the contribution of OA symptom severity (quartiles of WOMAC summary scores) to time to incident DM, unadjusted and then adjusted for covariates. Individuals were censored if they emigrated or died, or at the end of available data (February 28, 2011).
Results: Of 2,411 baseline cohort participants, 2,386 were eligible for inclusion. Of these, 480 who met criteria for DM at baseline were excluded. Over a median 10.2 yrs follow-up (IQR 4.8-14.4 yrs), 403 (21.1%) of the remaining 1,906 OA participants developed DM. In multivariable analyses, risk of incident DM was independently and significantly associated with lower education (p=0.02), self-reported hypertension (p=0.0009), number of primary care physician visits over the pre-baseline year (p=0.007), increasing BMI (p<0.0001) and an age*sex interaction (p=0.04), such that there was no effect of increasing age in men, but increasing age was associated with decreasing risk for incident DM in women. Controlling for these variables, we found no association for OA severity (WOMAC pain, function or summary scores) with risk for incident DM (p>0.05 for all).
Conclusions: In a population cohort with at least moderate hip/knee OA symptoms and disability but without comorbid baseline DM, greater OA severity was not associated with increased risk for development of DM.

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AGE AND BMI VARIATIONS IN BONE, MUSCLE, FAT ON AP MID THIGH RADIOGRAPHS

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Purpose: The most widely used formula to qualify obesity is body mass index (BMI). Although convenient and easy to calculate it fails to take into account the relative weight contributed by muscle, bone, and fat. This is important because metabolic syndrome (obesity, diabetes, hypertension cardiovascular disease, and hypercholesterolemia) requires a more accurate measure of true body fat for epidemiologic studies. This study looks as variations in fat, muscle, and bone seen on thigh radiographs.
Methods: This IRB approved protocol retrospectively reviewed 340 patients with knee OA symptoms who had been imaged with a recent anterior-posterior radiograph. Patient selection was on clinic visit for osteoarthritis symptoms confirmed by imaging and clinical data. Race, age, and sex distribution was typical for our other lower limb osteoarthritis studies. Males and females were divided into 6 height groups with 5.08 cm (2 inch) increments. Weight was recorded in kilograms (kg).
Using AP routine radiographs we determined the relative contribution of bone, muscle, and fat to thigh width at a height adjusted point proximal to the knee joint line. To insure reliability we did a set of 11 measures separately and a Spearman's correlation coefficient and an intra-class correlation coefficient were calculated for each of three measures. All continuous variables were evaluated for by regression assumptions. Analysis of variance and simple linear regression models were run to examine the relationship between the thigh diameter measures and the main effect of BMI, and then with each covariate of age and sex. Significance was set at p<0.05. All variables were placed into three multivariable general linear models with BMI as the main effect and with age and sex as covariates. All interactions between the main effect and the covariates were tested. Statistical significance was set at p<0.05.
Results: The range of the muscle diameter (MD) bone diameter (BD) and non fat (NFD) ratio within all BMI groups was striking. As would be expected there was a statistically significant decrease in MD ratio with each BMI increment (p-value of 0.0002).
Using a full factorial analysis of variance, BMI, age, and sex were compared. The interaction between BMI and age was not statistically significant. However females had a statistically significant negative association between BMI and the MD ratio: there muscle mass did not increase with increasing BMI as it did with males. Intra-rater correlation r values for BD/TD was 0.845 (p .001), MD/TD 0,873 (p <001), and NFD/TD .900 (p <.001). The intra-class coefficient was 0.865 for BD/TD, 0.868 for MD/TD, and 0.912 for NFD/TD.
Conclusions: Radiographs are readily available in most knee OA studies. Central body fat appears to be related to metabolic syndrome. Future studies that need to be done to determine the clinical relevance of these findings contrasting BMI, waist to buttocks diameter ratio, and thigh measures. This would give a low cost better estimate of true relative body fat.

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OSTEOARTHRITIS OF THE HIP AND/OR KNEE IN DUTCH GENERAL PRACTICE AND PHYSIOTHERAPY PRACTICE

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Purpose To describe demographic characteristics and the treatment process of patients with hip osteoarthritis (OA) or knee OA treated in Dutch general practice (GP) and/or physiotherapy practice. Additionally, to investigate whether there are differences in characteristics between